

Leaf Cell Energy

Trace how matter and energy move through two linked cell processes.

LS.4.b "photosynthesis and cellular respiration support life processes."

NAME _____

DATE _____

1 READ AND MARK _____ Read it twice

YOUR JOB Underline each sentence that names a material used or made in photosynthesis or cellular respiration. In the margin, write P, R, or P/R to show which process or processes the sentence describes.

A Plant's Linked Processes

- ① On a sunny windowsill, a bean plant uses energy from sunlight to build food. In leaf chloroplasts, photosynthesis combines carbon dioxide from the air with water taken up by roots. The process stores some of the captured light energy in glucose and releases oxygen. The plant can use glucose right away, convert it to transportable sugars for growing tissues, or store it for later. Photosynthesis provides both food molecules and oxygen that many living things need.
- ② Cells in the plant, and cells in animals, use cellular respiration to transfer energy from glucose into ATP, a molecule cells can use for work. Most cellular respiration occurs in mitochondria. Oxygen helps break down glucose, producing carbon dioxide and water. The cell does not create energy during this process. Instead, energy stored in glucose is transferred, with some captured in ATP and some released as heat. ATP can power movement, growth, repair, and active transport.
- ③ Photosynthesis and cellular respiration are linked by the materials they use and produce. Carbon dioxide and water made during cellular respiration can be used in photosynthesis. Glucose and oxygen made during photosynthesis can be used in cellular respiration. In a plant, both processes occur, but in different cell parts and at different times or rates. During daylight, photosynthesis can capture energy in sugars while respiration continues to supply ATP for cell activities. Animals rely on food and oxygen from ecosystems, then release carbon dioxide and water.

2 ANSWER WITH EVIDENCE _____ Use the passage

1 What materials does photosynthesis use, and what materials does it produce?

2 What happens to energy stored in glucose during cellular respiration? Include ATP and heat in your answer.

3 How can materials made during cellular respiration become inputs to photosynthesis? Name two materials.

4 During daylight, how do photosynthesis and cellular respiration work together to support a plant's cell activities?

3 YOUR TURN _____ Your own words

Write exactly 3 sentences about a basil plant growing in sunlight. Explain how photosynthesis captures and stores energy, how cellular respiration transfers energy to ATP, and how at least one material connects the two processes.

PART 1 • READ AND MARK

Underline each sentence that names a material used or made in photosynthesis or cellular respiration. In the margin, write P, R, or P/R to show which process or processes the sentence describes. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What materials does photosynthesis use, and what materials does it produce?	Photosynthesis uses carbon dioxide and water. It produces glucose and oxygen.
2	What happens to energy stored in glucose during cellular respiration? Include ATP and heat in your answer.	Energy stored in glucose is transferred. Some is captured in ATP, and some is released as heat.
3	How can materials made during cellular respiration become inputs to photosynthesis? Name two materials.	Cellular respiration produces carbon dioxide and water. Both can be used in photosynthesis.
4	During daylight, how do photosynthesis and cellular respiration work together to support a plant's cell activities?	Photosynthesis captures light energy in sugars. Cellular respiration transfers energy from glucose into ATP, which supports cell activities.

PART 3 • YOUR TURN (SAMPLE ANSWER)

A basil plant in sunlight captures light energy during photosynthesis and stores some of it in glucose. Its cells use glucose and oxygen in cellular respiration, transferring some energy to ATP for growth and moving materials. Respiration releases carbon dioxide and water, which can later be used in photosynthesis.

Accept equivalent descriptions of inputs, products, and energy transfer that match the passage. For the open response, check that the student distinguishes captured energy in glucose from energy transferred to ATP and correctly links materials between the processes.